

BOTTLENOSE DOLPHIN (*Tursiops truncatus*): California Coastal Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Bottlenose dolphins are distributed world-wide in tropical and warm-temperate waters. In many regions, including California, separate coastal and offshore populations are known (Walker 1981; Ross and Cockcroft 1990; Van Waerebeek et al. 1990). California coastal bottlenose dolphins are found within about one kilometer of shore (Figure 1; Hansen, 1990; Carretta et al. 1998; Defran and Weller 1999) primarily from Point Conception south into Mexican waters, at least as far south as Ensenada. Oceanographic events appear to influence the distribution of animals along the coasts of California and Baja California, Mexico, as indicated by a change in residency patterns along Southern California and a northward range extension into central California after the 1982-83 El Niño (Hansen and Defran 1990; Wells et al. 1990). Since the 1982-83 El Niño, which increased water temperatures off California, they have been consistently sighted in central California as far north as San Francisco. Photo-identification studies have documented north-south movements of coastal bottlenose dolphins (Hansen 1990; Defran et al. 1999), and monthly counts based on surveys between the U.S./Mexican border and Point Conception are variable (Carretta et al. 1998), indicating that animals are probably moving into and out of this area. Although coastal bottlenose dolphins are not restricted to U.S. waters, cooperative management agreements with Mexico exist only for the tuna purse seine fishery and not for other fisheries which may take this species (e.g. gillnet fisheries). Therefore, the management stock includes only animals found within U.S. waters.

For the Marine Mammal Protection Act (MMPA) stock assessment reports, bottlenose dolphins within the Pacific U.S. Exclusive Economic Zone are divided into three stocks: 1) California coastal stock (this report), 2) California, Oregon and Washington offshore stock, and 3) Hawaiian stock.

POPULATION SIZE

Photo-identification studies along the coasts of southern California and northern Mexico identified 404 unique individuals in this population between 1981 and 1989 based on dorsal fin characteristics, with an estimated 35% of animals lacking identifiable characters at any particular time (Defran and Weller 1999). This cannot be considered a minimum population estimate, however, because an unknown number of animals died during this period and rates of acquisition of dorsal fin characters are not known. Mark-recapture estimates based on photo-identification studies in 1985-89 range from 234 (95% CI 205-263) to 285 (95% CI 265-306) animals for the entire California-Mexico population (Defran and Weller 1999). Because coastal bottlenose dolphins spend an unknown amount of time in Mexican waters, where they are subject to mortality in Mexican fisheries, an average abundance estimate for California

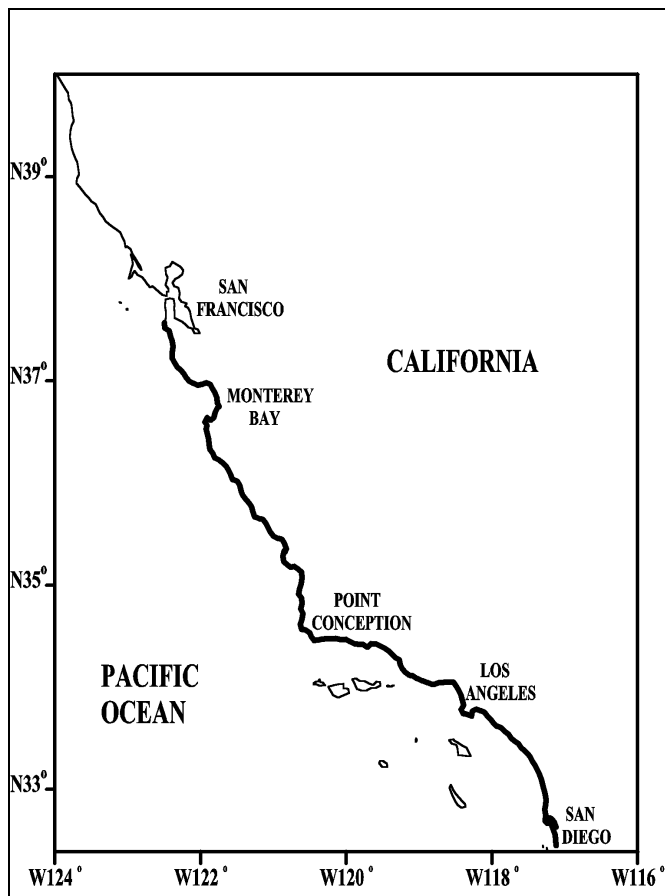


Figure 1. Range (in bold) of the coastal bottlenose dolphin based on aerial surveys along the coast of California from 1990-99 (see Appendix 2, Figure 7, for data sources and information on timing and distribution of survey effort). This population of bottlenose dolphins is found within about 1 km of shore.

only is the most appropriate for U.S. management of this stock. Tandem aerial surveys were conducted in 1990-94 to estimate the abundance of coastal bottlenose dolphins throughout the southern California portion of their U.S. range. (Carretta et al. 1998). These estimates, which are corrected for the fraction of animals missed by a single observer team, range from 78 to 271 animals, with a mean abundance estimate of 140 bottlenose dolphins (CV = 0.05). These surveys did not include the central California portion of this stock's range, and therefore the published abundances underestimate the total number of animals in U.S. waters by an unknown amount. More recently, two surveys were conducted in 1994 and 1999, covering virtually the entire U.S. range of this species, from the U.S./Mexican border to just south of San Francisco, California. Using the same methods and correction factors as in Carretta et al. (1998), the weighted average abundance estimate for these two surveys is 169 (CV=0.11) coastal bottlenose dolphins (NMFS, SWFSC, unpublished data). This presently is the best estimate of the average number of coastal bottlenose dolphins in U.S. waters.

Minimum Population Estimate

The log-normal 20th percentile of the above average abundance estimate for U.S. waters based on the 1994 and 1999 surveys is 154 coastal bottlenose dolphins.

Current Population Trend

No trend in abundance of coastal bottlenose dolphins is apparent based on the available data.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No information on current or maximum net productivity rates is available for California coastal bottlenose dolphins.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (154) times one half the default maximum net growth rate for cetaceans ($\frac{1}{2}$ of 4%) times a recovery factor of 0.50 (for a species of unknown status with no known fishery mortality; Wade and Angliss 1997), resulting in a PBR of 1.5 coastal bottlenose dolphins per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

Due to its exclusive use of coastal habitats, this bottlenose dolphin population is susceptible to fishery-related mortality in coastal set net fisheries. A summary of information on fishery mortality and injury for this stock of bottlenose dolphin is shown in Table 1. More detailed information on the set gillnet fishery is provided in Appendix 1. From 1991-94, no bottlenose dolphins were observed taken in this fishery with 10-15% observer coverage (Julian and Beeson 1998). The observer program was discontinued at the end of 1994, when coastal set gillnet fishing was banned within 3 nmi of the southern California coast. In central California, gillnets have been restricted to waters deeper than 30 fathoms (56m) since 1991 in all areas except between Point Sal and Point Arguello. Because of these closures, the potential for mortality of coastal bottlenose dolphins in the California set gillnet fishery has been greatly reduced since 1994. Fisher self-report data and stranding records for 1994-98 do not include any records of fishery interactions for this stock. Coastal gillnet fisheries exist in Mexico and probably take animals from this population, but no details are available.

Table 1. Summary of available information on the incidental mortality and injury of bottlenose dolphins (California Coastal Stock) in commercial fisheries that might take this species.

Coastal Stock in Commercial Fisheries that might take this species:						
Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed Mortality	Estimated Annual Mortality	Mean Annual Takes
CA angel shark/ halibut and other species large mesh (>3.5in) set gillnet fishery	observer data	1991-94	10-15%	0	0	0
		1995-98	0%			
Minimum total annual takes						0

Other removals

Seven coastal bottlenose dolphins were collected during the late 1950s in the vicinity of San Diego (Norris and Prescott 1961). Twenty-seven additional bottlenose dolphins were captured off California between 1966 and 1982 (Walker 1975; Reeves and Leatherwood 1984), but based on the locations of capture activities, these animals probably were offshore bottlenose dolphins (Walker 1975). No additional captures of coastal bottlenose dolphins have been documented since 1982, and no live-capture permits are currently active for this species.

STATUS OF STOCK

The status of coastal bottlenose dolphins in California relative to OSP is not known, and there is no evidence of a trend in abundance. They are not listed as "threatened" or "endangered" under the Endangered Species Act nor as "depleted" under the MMPA. Because no recent fishery takes have been documented, coastal bottlenose dolphins are not classified as a "strategic" stock under the MMPA, and the total fishery mortality and serious injury for this stock can be considered to be insignificant and approaching zero.

Habitat Issues

Pollutant levels, especially DDT residues, found in Southern California coastal bottlenose dolphins have been found to be among the highest of any cetacean examined (O'Shea et al. 1980; Schafer et al. 1984). Although the effects of pollutants on cetaceans are not well understood, they may affect reproduction or make the animals more prone to other mortality factors (Britt and Howard 1983; O'Shea et al. 1999). This population of bottlenose dolphins may also be vulnerable to the effects of morbillivirus outbreaks, which were implicated in the 1987-88 mass mortality of bottlenose dolphins on the U.S. Atlantic coast (Lipscomb et al. 1994).

REFERENCES

- Britt, J. O. and E. B. Howard. 1983. Tissue residues of selected environmental contaminants in marine mammals. *In*: Howard, E. B. (ed.), Pathobiology of Marine Mammal Diseases. CRC Press, Boca Raton, Florida.
- Carretta, J. V., K. A. Forney and J. L. Laake. 1998. The abundance of southern California coastal bottlenose dolphins estimated from tandem aerial surveys. *Mar. Mamm. Sci.* 14:655-675.
- Defran, R. H. and D. W. Weller. 1999. Occurrence, distribution, site fidelity and school size of bottlenose dolphins (*Tursiops truncatus*) off San Diego, California. *Mar. Mamm. Sci.* 15:366-380.
- Defran, R. H., D. W. Weller, D. L. Kelly, and M. A. Espinosa. 1999. Range characteristics of Pacific coast bottlenose dolphins (*Tursiops truncatus*) in the Southern California Bight. *Mar. Mamm. Sci.* 15:381-393.
- Hansen, L. J. 1990. California coastal bottlenose dolphins. *In*: S. Leatherwood and R.R. Reeves (eds.), The Bottlenose Dolphin, p.403-420. Academic Press, Inc., San Diego.
- Hansen, L. J. and R. H. Defran. 1990. A comparison of photo-identification studies of California coastal bottlenose dolphins. *Rep. Int. Whal. Commn. Special Issue* 12:101-104.
- Julian, F. and M. Beeson. 1998. Estimates of mammal, turtle and bird mortality for two California gillnet fisheries: 1990-1995. *Fish. Bull.* 96:271-284.
- Lipscomb, T. P., F. Y. Schulman, D. Moffett, and S. Kennedy. 1994. Morbilliviral disease in Atlantic bottlenose dolphins (*Tursiops truncatus*) from the 1987-88 epizootic. *Journal of Wildlife Diseases* 30:567-571.
- O'Shea, T. J., R. L. Brownell, Jr., D. R. Clark, W. A. Walker, M. L. Gray, and T. G. Lamont. 1980. Organochlorine pollutants in small cetaceans from the Pacific and South Atlantic Oceans, November 1968-June 1976. *Pesticides Monitoring Journal* 14:35-46.
- O'Shea, T. J., R. R. Reeves, and A. Kirk Long (eds.). 1999. Marine Mammals and Persistent Ocean Contaminants: Proceedings of the Marine Mammal Commission Workshop, Keystone, Colorado, 12-15 October 1998. Marine Mammal Commission, Bethesda, MD. 150pp.
- NMFS, Southwest Fisheries Science Center. P.O. Box 271, La Jolla, CA 92038-0271
- Norris, K. S. and J. H. Prescott. 1961. Observation on Pacific cetaceans of Californian and Mexican waters. University of California Publications in Zoology 63:291-402. University of California Press, Berkeley and Los Angeles.
- Reeves, R. R. and S. Leatherwood. 1984. Live-capture fisheries for cetaceans in USA and Canadian waters, 1973-1982. *Rep. Int. Whal. Commn.* 34:497-507.
- Ross, G. J. B. and V. G. Cockcroft. 1990. Comments on Australian bottlenose dolphins and the taxonomic status of *Tursiops aduncus* (Ehrenberg, 1832). *In*: The Bottlenose Dolphin (eds. S. Leatherwood and R. R. Reeves). pp. 101-128. Academic Press, 653pp.

- Schafer, H. A., R. W. Gossett, C. F. Ward, and A. M. Westcott. 1984. Chlorinated hydrocarbons in marine mammals. Biennial Report, 1983-84, Southern California Coastal Water Research Project, Long Beach, California.
- Van Waerebeek, K., J. C. Reyes, A. J. Read, and J. S. McKinnon. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. *In: The Bottlenose Dolphin* (eds. S. Leatherwood and R. R. Reeves). pp. 143-154 Academic Press, 653 pp.
- Walker, W. A. 1975. Review of the live-capture fishery for smaller cetaceans taken in Southern California waters for public display, 1966-77. *J. Fish. Res. Board. Can.* 32:1197-1211.
- Walker, W. A. 1981. Geographical variation in morphology and biology of bottlenose dolphins (*Tursiops*) in the eastern North Pacific. Admin. Rep. LJ-81-03C. Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038, USA. 52p.
- Wells, R. S., L. J. Hansen, A. B. Baldrige, T. P. Dohl, D. L. Kelly and R. H. De Fran. *In: S. Leatherwood and R. R. Reeves* (eds.), *The Bottlenose Dolphin*, p. 421-431. Academic Press, Inc., San Diego.
- Wade, P. R. and R. P. Angliss. 1997. Guidelines for Assessing Marine Mammal Stocks: Report of the GAMMS Workshop April 3-5, 1996, Seattle, Washington. U. S. Dep. Commerce, NOAA Tech. Memo. NMFS-OPR-12. 93 pp.